



# WHITE PAPER

The Next Generation:  
Integrated, Modular & Secure ID Cards



# INTRODUCTION

Identification cards have been used in one form or another for over 100 years. But these documents have never received as much attention as they do today. Within the past decade ID cards, such as driver's licenses and national ID's, have been the subject of tremendous scrutiny as the industry determines how to create the most secure and durable form of identification. This paper explores the current best practices, processes, and technologies for producing an ID card for the world's most secure applications.

## BACKGROUND

Identity cards have come a long way from the early days of printing a paper card and manually laminating it within a plastic pouch. This was the predominate method of making ID cards for many years, but in the early 1990's, thermal printing (a technology commonly used in fax machines), was catching on in the financial card market. Direct dye thermal card printers were now producing credit cards and other financial cards made of Polyvinyl chloride (PVC). Slowly this technology was applied to driver's licenses, national ID's, voter ID's, and other high security cards.

The solution seemed to be a great fit – simple, cost effective, and automated.

Unfortunately it wasn't long before these new cards failed in the field. Durability quickly became an issue as cards started cracking and breaking. Driver's licenses and other government ID's take a lot more

abuse than the average credit card and demand greater durability. Plus, they have a much longer lifecycle. The average life of a high security ID is about eight years, compared to less than half that for a financial card.

The broken cards were due to the composition of the PVC substrate. PVC contains plasticizers that increase the fluidity or plasticity of a material, but these plasticizers eventually migrate to the surface of the card and leave them brittle and inflexible. On the opposite end, polyester cards are extremely durable, but they do not possess the same dye receptive qualities as PVC. Flatness became an issue because the cards were not stiff enough to retain their shape. Soon it was realized that if polyester was added to the PVC mix, the card would have the best of both worlds: great print quality from PVC and increased durability and flexibility thanks the polyester. What resulted is the commonly known PVC/PET composite card, a formulation constantly being refined.

When used in conjunction with a front and back one millimeter thick patch overlamine, these cards offer a very long card life and high security. In fact, this solution is commonly used to produce U.S. driver's licenses in over-the-counter (instant issuance) facilities as well as a number of central issuance applications. The over-the-counter process uses dye diffusion thermal printers to produce ID cards immediately and allows the card holder to receive his or her card on the spot.

Other cards currently used in the market are teslin, polycarbonate and polycarbonate composite. These types of cards are utilized in central issuance card facilities that produce large quantities of ID cards using high-end laser or dry toner printers. Instead of printing one card at a time, these machines print three cards across at a time on a ten millimeter continuous roll feed supply of card substrate. Once these cards are printed, they are in-line laminated on both sides using ten millimeter thick roll feed laminates. Once laminated, the cards are fed to an in-line die cutting station to punch out the ISO CR-80 sized ID cards. Liquid toner digital

printing presses have replaced the dry toner laser engines in some recent installations because they produce superior imaging capabilities and added flexibility.

Traditionally, teslin was the material commonly used in these large central issue facilities. Although relatively new to the U.S. market, polycarbonate has been used around the world for several years. This material can be combined with various plastics such that the best attributes of flex strength, bond strength, flatness, print quality and overall card uniformity are achieved. This new card technology is now being used for central issue and when coated with dye receptive formulas, can also be used for instant issue.

This new card technology is now used in both desktop and digital press printing.

Polycarbonate also allows for laser engraving – a unique security feature with a tactile feel.

### Integrated, Modular and Secure Card Solutions

OpSec Security has been in the high security business for 25 years and has been a leader and preferred provider of high security solutions for businesses and governments around the world. In the past, OpSec's offerings have primarily included high security devices applied to overlaminates and card substrates. However, OpSec now offers a complete card solution that provides an integrated combination of high security features, secure data management, and durable ID card materials.

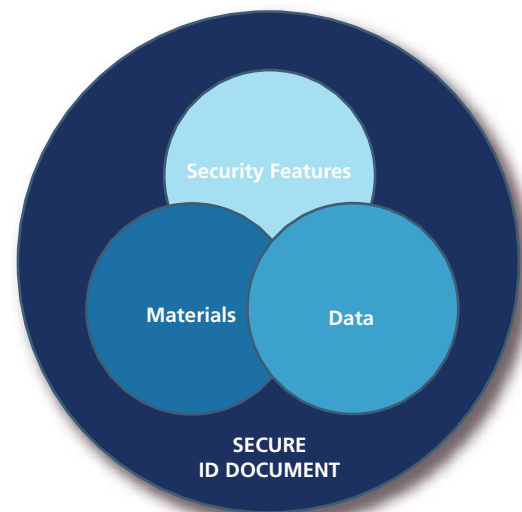
#### Secure Card Solution Suite

The OpSec Secure Card Solution Suite is comprised of five specially formulated card solutions:

- Polycarbonate
- Polycarbonate Composite
- PVC/PET Composite
- Contact-less smart chip or RFID
- Temporary Card using secure cast paper technology

These cards are uniquely engineered to meet the demanding requirements of only the highest security applications. Governments and systems integrators worldwide trust OpSec's expertise in

anti-counterfeiting card technologies to produce custom tailored solutions for their specific ID needs.



These secure solutions are built by integrating the most appropriate anti-counterfeiting technologies and durable materials with secure personal data. OpSec's Secure Card Solution Suite combines ID printing hardware & software, secure cardstock, and multi-layered security features with personalization services, chip encoding, and track & trace capabilities for both over-the-counter and central issuance systems. OpSec recognizes that in order for a document to be as secure as possible, the security features must be linked to the materials and the personalized data. These three important components must work in concert to



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produce a secure identification document. High security demands high durability. For this reason, OpSec cards have been rigorously tested. They exceed the stringent standards required by ANSI INCITS, AAMVA, ICAO, ISO/IEC, and other national and international identity card standards. OpSec extensively employs internationally recognized independent testing laboratories to validate a product's quality, performance, and customer assurance.

OpSec secures  
60 million ID  
documents  
worldwide  
annually.

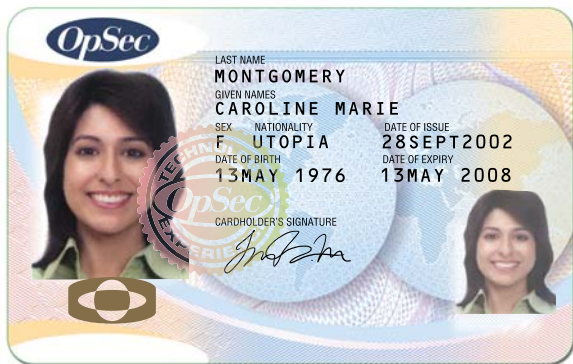
OpSec has developed its cards to meet the highest specifications for the security of identification documents. The cards are durable enough to survive the wear and tear of everyday use for well over eight years – the average life of high security government ID's. OpSec's cards are produced in secure manufacturing facilities where industry best practices are employed to ensure secure production and supply chain

processes. Security features are designed to address the three common levels of security protection – overt, covert, and forensic. Overt security features, such as holograms, are easily seen with the naked eye and can quickly verify the authenticity of an ID card. Covert features require a special tool, much like a UV image requires a black light. The third and most complex level of security is the forensic feature. A forensic feature can only be detected in a forensic laboratory and usually requires destroying the document.

Many security features have been developed to counteract fraud and protect driver's licenses, national ID's, and other high security documents. Most commonly, ultraviolet (UV) inks, optically variable inks (OVI's), and holograms are used because they provide a solid level of security at an affordable price. Invisible UV inks are special inks which are only visible when illuminated by an ultraviolet light. OVI's have color shifting properties that vary based on the viewing angle. Holograms are 2-D or 3-D images or text which, when viewed at different angles, produce a full spectrum of colors.

THE NEXT GENERATION

## Advanced High Security Protection, Innovative Design



Drawing from 25 years of industry expertise, OpSec combines an array of features in a way that protects on all three levels of security. These features include advanced security printing, such as guilloche and micro-printing, laser engraving, and OpSec's proprietary liquid crystal OVD's. OpSec can also include embedded RFID and chip technology. These strategically placed security features, combined with innovative card design, create the most secure ID card. When structured properly, this card prevents all four threats posed to ID's – counterfeiting, alteration, photo or signature substitution, and use of cannibalized components. OpSec's comprehensive security system can contain the following features.

### Liquid Crystal OVD:



OpSec Security developed a highly specialized liquid crystal which protects ID cards overtly, covertly, and forensically – something very few devices can do. OpSec's newest formulation liquid crystal, SecurMAX™, can provide all three levels of security in a very thin, durable, and cost effective way.

SecurMAX™ is a custom image that is embedded in the card substrate. It is a liquid crystal device with unique multi-color and polarizing qualities which result in the image having various effects when viewed at different angles. In normal lighting, both daylight and artificial, the image shifts through a whole spectrum of metallic luster colors: red to green to blue/violet, depending on the viewing angle. Head on, the image is transparent so it doesn't take up any valuable real estate on the card or mask pertinent data. This color shifting is easy to recognize and provides level one, overt protection. Plus, if an attempt is made to tamper with the device, the liquid crystal will fracture, leaving clear tamper evidence.

In over 20 years, OpSec's Liquid Crystal OVD's have never been compromised.

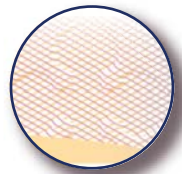
Additionally, SecurMAX has a simple on/off verification feature which provides level two, covert protection. When the feature is seen through the polarized lens of the SecurMAX Viewer, one filter will show all its color effects while the other will completely conceal it, appearing invisible.

Most importantly, SecurMAX also offers forensic protection with its complex chemistry. If authenticity is ever in question, it can be verified in a laboratory. SecurMAX has a unique chemical structure which can be detected only with a high powered microscope. SecurMAX is the culmination of 20 years of liquid crystal technology development.

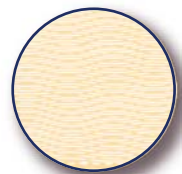
**Intentional Error:** An intentional mistake within a feature known only to the manufacturer or inspection officials.



**Prismatic Printing:** Must demonstrate a controlled exacting color shift subtly in a linear continuous fashion. Accurately designed patterns cannot be easily copied or duplicated via scanning. It is applied using a non-commercial method of printing. It is often used with a fine line or medallion pattern in the background of a card.



**Line Emboss Design:** Creates the illusion of a raised surface. Complex architecture is difficult to reproduce.



**Moire Pattern:** A pattern formed by the super positioning of two patterns whose periodicities are not identical. Security designs can be developed so that a scanner or copier will only display part of the pattern, and/or a word such as VOID or COPY will appear instead of the pattern.

**Full Color Invisible UV Ink:** Most UV ink is commonly available in one or two colors. Full color UV creates near photographic images and text that are invisible to the naked eye and only become fully realized under a UV light.



**Microtext/Nanotext:** Very fine printing that is unreadable to the human eye or a copy machine. Can be easily embedded into the normal graphics design or text. May include an intentional error.

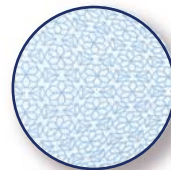


**Optically Variable Ink (OVI):** Creates noticeable reflecting color shifts (e.g., gold to green, green to blue). Cannot be replicated or digitally recreated.



**Variable Line Design:** Varying line thickness that cannot be recreated by a scanner or copier

**Opacity Mark:** Hidden graphics or text buried inside the lamination layers unseen to the naked eye. Only visible when held to a strong light source.

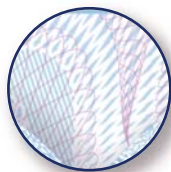


**Geometric Raster:** Geometric security pattern which can serve as part of the card design and cannot be replicated.



**Tamper Evident Photo Border:**

Complex border which prevents photo substitution.



**Guilloche/Fine Line Design:** Highly complex multiple color design patterns generated by a mathematical formula. Impossible to reproduce by copy machines or recreate digitally, this can be integrated with existing artwork to create a totally unique background design.

### Secure Personalized Data

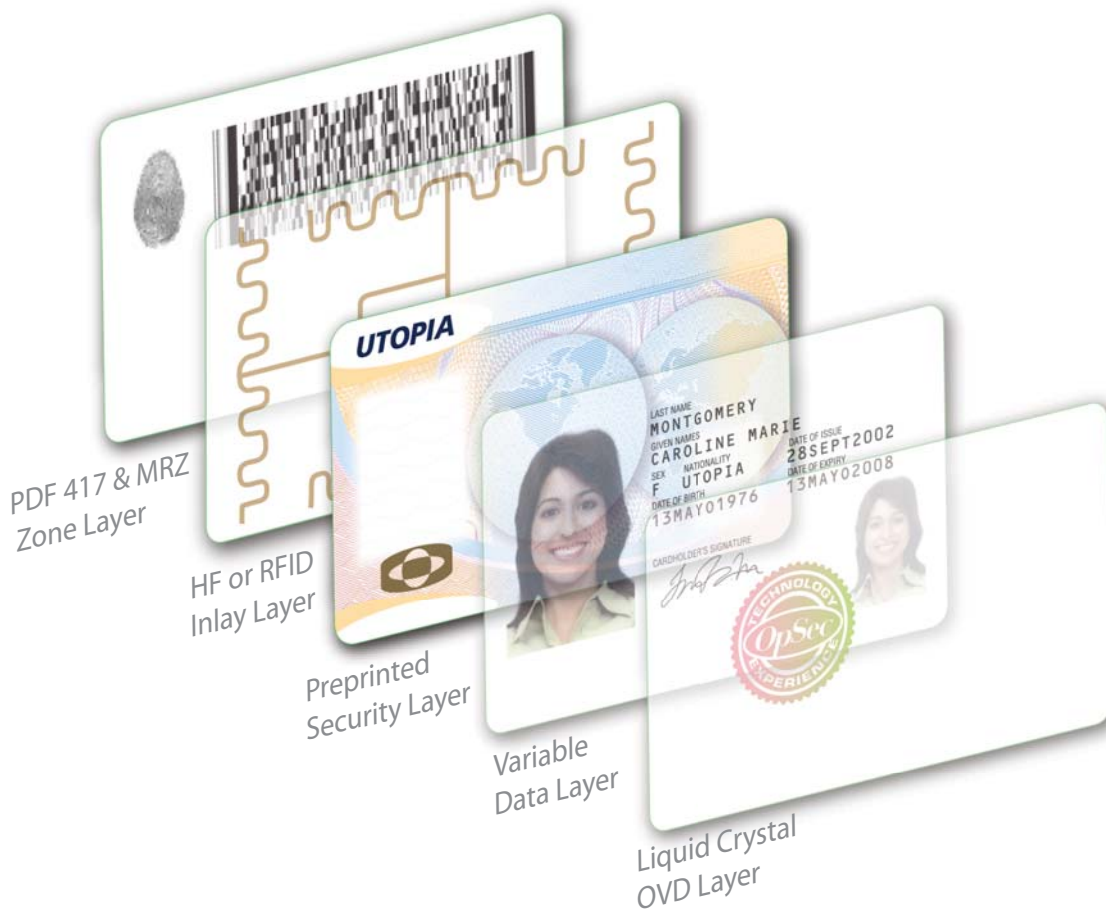


**Laser Engraving:** Burning tamper-proof unique variable data onto the face of a card, such as a signature or serial number. May also have a tactile feel.

**Chip Encoding:** High speed encodable chip applied to a traditional card that stores information unique to the individual.

**Track & Trace:** A method of securing the supply chain and issuance process such that products can be verified and authenticated at any time.

**RFID:** HF or RFID inlay buried in the card that is encoded with unique identification. Capable of being written for different levels of security access.



***Inspired by Technology.***

***Proven by Experience.®***

OpSec understands the challenges of protecting and securing identity documents. For over 25 years, OpSec has been a pioneer in comprehensive security solutions for branded goods, identity cards, travel documents and currencies. OpSec serves as the single point of contact for integrated ID system solutions, from design through delivery with track & trace capabilities that secure the supply chain and issuance process.

OpSec's numerous proprietary and award-winning optical imaging technologies are created in state-of-the-art R&D laboratories in the US and the UK. These technologies are employed worldwide in 100 countries and on 5 continents. OpSec draws from the broadest technology portfolio in the industry to develop cost-effective, multi-layered security products. These solutions prevent alteration and counterfeiting, reduce fraud, and protect the intellectual property and equity of brand owners.

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